



## KRAUROSIS VULVÆ:\*

A DISEASE OF CHRONIC INFLAMMATORY NATURE AND CHARACTERIZED BY CUTANEOUS ATROPHY, WITH MARKED SHRINKING AND CONTRACTION OF THE VAGINAL ORIFICE.

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THIS exceedingly interesting and fortunately rather rare disease was first brought prominently to the attention of the medical profession by the classical article of Breisky,<sup>4</sup> published in 1885, in which he described at length twelve cases, and presented a clinical description of the condition which can scarcely be improved upon at the present day.

Ten years before that time, in 1875, Dr. Robert F. Weir,<sup>1</sup> of New York, described, under the name of ichthyosis, a condition of the vulva which, in its clinical characteristics, closely resembled kraurosis. Lawson Tait<sup>2</sup> seems to have noticed cases of a similar nature at about the same period that the article of Weir first appeared, which he then described as "serpiginous vascular degeneration of the nymphæ." But it was not until the observation of Breisky<sup>4</sup> that the disease was first looked upon as a distinct entity, apart from pruritus and the not uncommon senile atrophy of the vulva.

Clinically, the picture of this disease is most striking. The first symptoms noticed are usually those characteristic of pruritus, which consist of an intense and more or less progressive itching and burning of the vulva. In some cases the affected tissue is excessively hyperplastic and dyspareunia develops early. The skin is frequently discolored, and small red spots appear on the surface. Some time after these symptoms are noticed a peculiar shrinking of the superficial tissue of the vulva begins to take place. Discolored spots appear which are hyperæsthetic. The skin becomes dry and whitened, and often covered with a rough and thick epidermis.

The disease may be unilateral or circumscribed, but usually the tissues of the labia majora, the nymphæ, the area about the clitoris and urinary meatus all become more or less involved, while the skin about the anus is frequently affected. As the disease advances the small labia

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gradually disappear, fusing with the labia majora, and the skin becomes shiny and drawn smoothly over the shrunken clitoris, which has apparently retracted behind the skin, and is now only indicated by a small depression instead of a prominence. Underlying vessels are frequently seen through the transparent epidermis, and cracks appear on the dry surface, which extend often into the corium. A sensation of drawing and shrinking of the vulva is usually experienced, and the vaginal orifice becomes gradually narrower and more and more contracted, until frequently the little finger can scarcely be introduced, and all sexual intercourse becomes a physical impossibility. When this condition has been reached the pathological process is arrested, the subjective sensation of shrinking passes away, and the symptoms of pruritus, usually prominent only in the earlier stages of the disease, are no longer experienced. But the shrunken and contracted vaginal orifice still persists, and is never spontaneously restored.

That the disease occurs but rarely is shown by the fact that Fleischman,<sup>5</sup> who was especially on the watch for this condition in Breisky's clinic, in Prague, found only 8 cases in 1550 patients. On the other hand, Lewin, at the Charité, observed no case among 70,000 to 80,000 patients.

The pathological examinations of Breisky's cases, made by Fischels, form the foundation of our present knowledge. These researches showed the papillæ of the skin transformed into scar-like masses, the connective tissues of which were almost homogeneous, partly sclerotic, and without wavy fibres. The papillæ were, for the most part, low and varying in size, while the rete Malpighii was in places exceedingly thin. Sebaceous glands had disappeared altogether, and sweat glands were found to be almost entirely wanting. The microscopical examinations of Orthmann<sup>11</sup> in Martin's cases added still further to our knowledge of the pathology of the subject. He found some portions in a hypertrophic condition and other parts in a condition of atrophy. Under a thin horny layer the rete Malpighii was markedly narrow, some places showing but slight remains, the greater part of it having disappeared. The tissue of the corium had entirely lost its warty appearance, and was stretched and sclerotic. Here and there areas of small round-cell infiltration could be seen. The stratum Malpighii, outside the part of the true skin which was in a condition of hypertrophy, was atrophied. In other portions the horny layer was much wider, the cells being in strata of many layers upon a much-widened rete. The papillæ were much dragged out in width, and, like the corium, were more or less infiltrated with small round cells. Degenerative nerve processes were sought for, but not found, and, likewise, bacteriological examination proved negative. Up to this time, as Sânger points out, only the secondary stages of the disease had been described. The observations of Peters<sup>16</sup> are of especial

interest, as he described the condition of inflammatory hyperplasia of the connective tissue, with a tendency to scar-like shrinkage, and inflammation and œdema of the upper layers of the epidermis, as well as degeneration of the elastic tissue. As a result of his researches he classified the disease among the diffuse connective tissue hypertrophies of the skin. In a case studied by Neumann the horny layer of the epidermis formed ribbon-like strips of wavy course, the cell nuclei being scarcely distinguishable. Nowhere was the stratum lucidum to be seen, while the prickle cell layer was perfectly prominent.

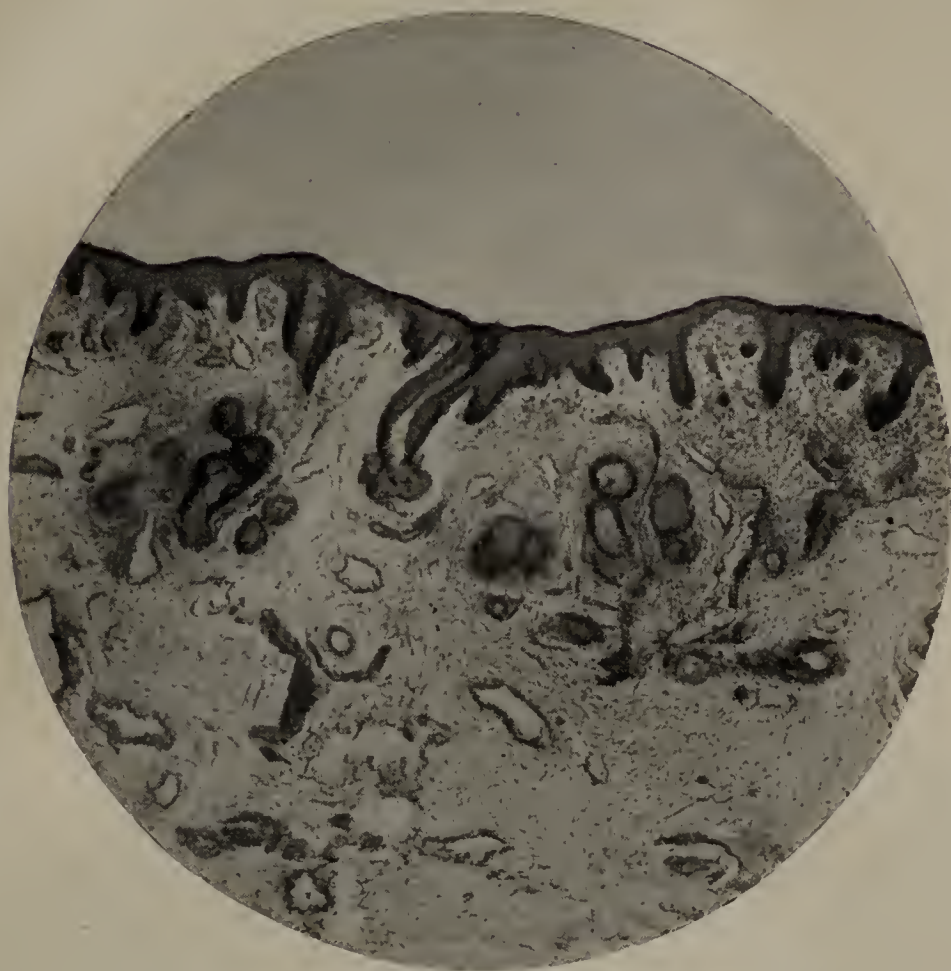
Longyear<sup>26</sup> made careful microscopical examination of several cases of kraurosis, and found bands of fibrous tissue below and entirely separate from the skin and mucous membrane, in the place of, and resulting from the destruction of, the subcutaneous and submucous cellular tissue. He believes that the pathological changes begin with a fibrous tissue formation in the subcutaneous tissue, and that the pathological changes in the skin are the result of the fibroid transformation in the underlying structure; that this new-formed fibrous tissue by contraction not only puckers the mucous membrane but strangles the blood-vessels.

The pathological examination of our own case is reported as follows: The specimens consist of several narrow strips of tissue which have been removed from the muco-cutaneous surface of the vaginal orifice and hardened in 10 per cent. formalin solution. These have been mounted in celloidin, cut in transverse section, and stained with hæmatoxylin-eosin, by Van Gieson's method, acid fuchsin, carmine, and by Weigert's method for nerve-fibres. (See Figs. 3 and 4.)

A general survey of the sections under the low power shows marked lesions both of atrophy and hypertrophy in different portions of the epidermis, with a general inflammatory condition of the corium and subcutaneous tissue. Examining now carefully the epidermis in detail, we note first that the stratum corneum, stratum lucidum, stratum granulosum, and stratum Malpighii can be differentiated with great distinctness in most of the thicker portions where hypertrophy is present, while in the parts where atrophy has taken place the layers are indistinctly blended together, the stratum lucidum can scarcely be discerned, and the stratum Malpighii fades away often to a mere thread. On the free surface of the epidermis, and so closely adherent to the stratum corneum that it appears as another layer, a blood-crust is seen. This crust is made up of red blood-corpuscles, the outlines of which are distinctly apparent in most parts, with a few leucocytes caught here and there among them. At intervals along the surface cracks, or fissures in the epidermis, are found, which usually penetrate the corium, and are often filled with blood-crusts (See Figs. 5 and 6.) Near the border of healthy tissue the stratum corneum appears normal or as a narrow band of ker-

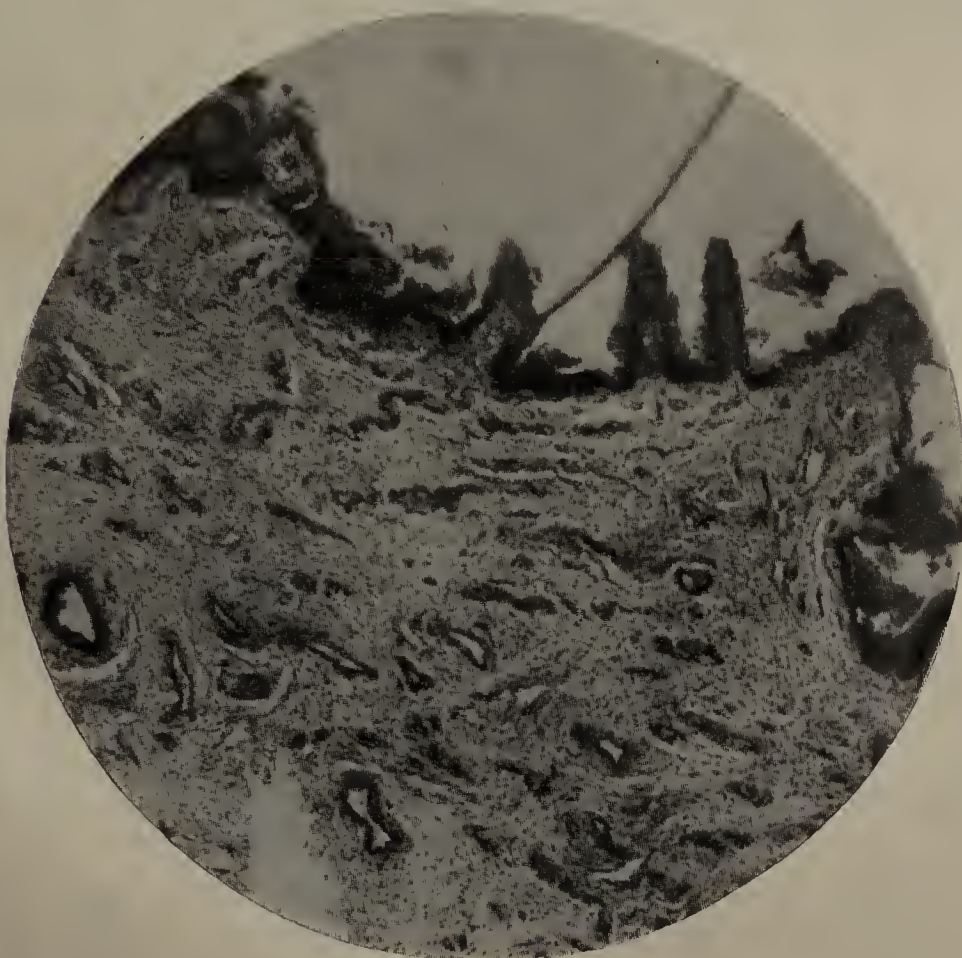


FIG. 1.



Microphotograph of normal labium majus, showing numerous hair-follicles, sebaceous glands, and bloodvessels in the subepithelial tissue.

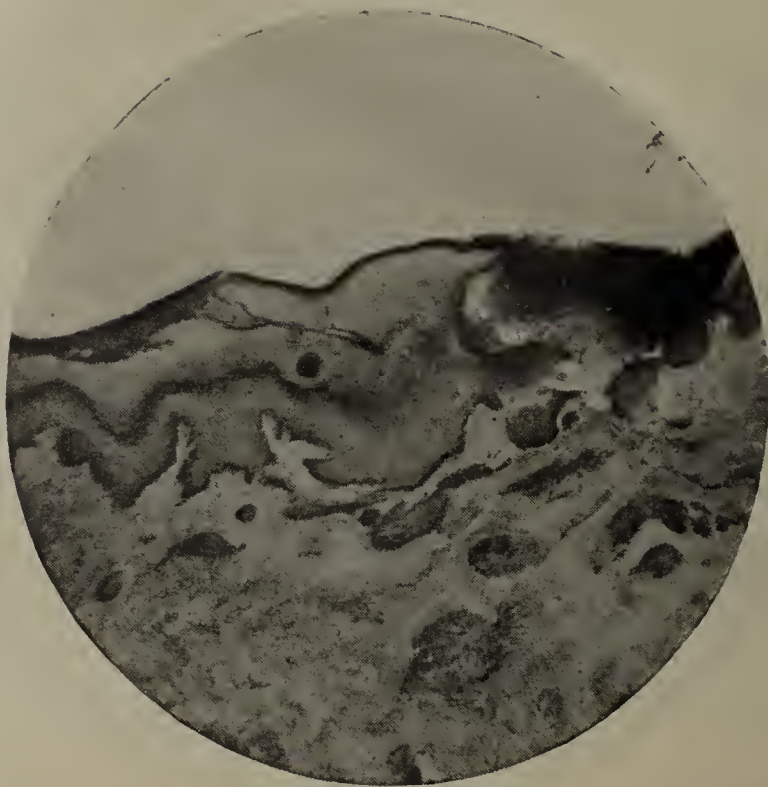
FIG. 2.



Microphotograph of normal labium minus, showing the subepithelial tissue rich in bloodvessels, elastic and muscular fibres, but entire absence of hair-follicles and sebaceous glands.

atinous tissue, with protoplasmic outlines indistinct, and with no nuclei. As we follow it into the diseased portion it becomes enormously thick-

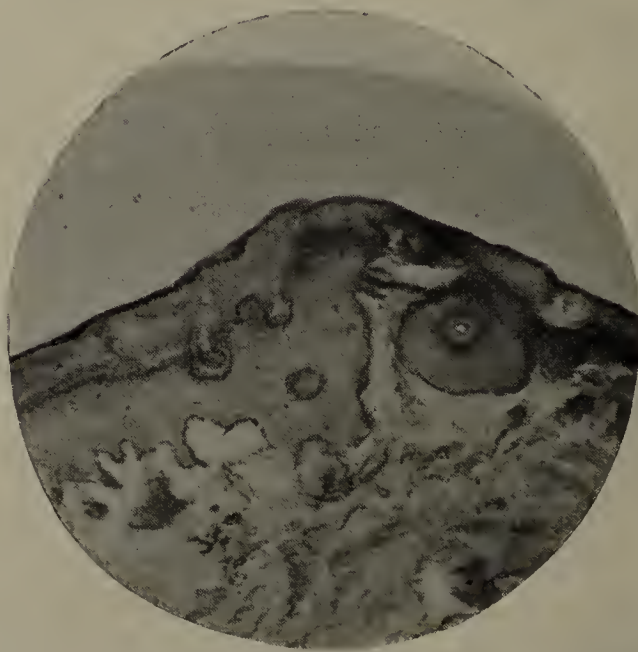
FIG. 3.



Microphotograph of labium, showing great hypertrophy of epidermis. (See Figs. 1 and 6. Blood-clot upon the surface, and entire absence of sebaceous glands and hair-follicles in the corium.

ened in some areas, and in other localities almost entirely disappears. No protoplasmic outline can be at all discerned, the hæmatoxylin stain

FIG. 4.



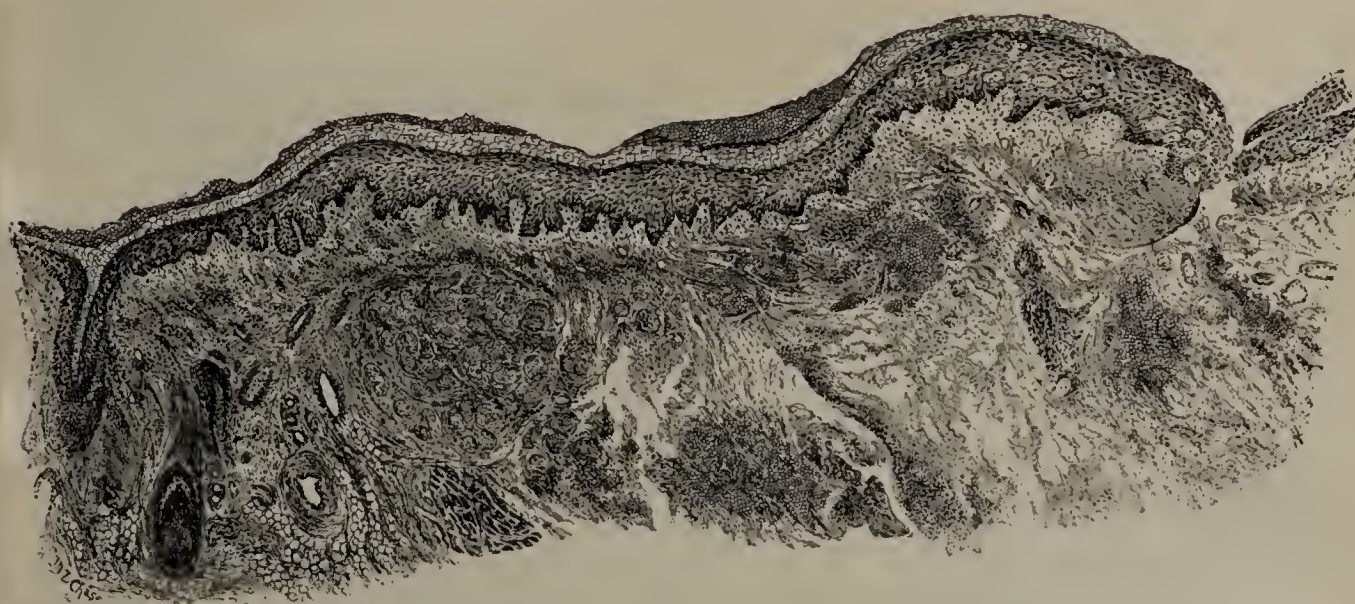
Microphotograph of labium, showing enormous hypertrophy of stratum corneum and stratum Malpighii; epithelial pearls in the epidermis.

is taken indistinctly, or not at all, and there is a marked tendency to the formation of whirls and twists resembling epithelial pearls. Free red blood-corpuscles are also occasionally present, and degenerate hair-



follicles are discoverable, both in longitudinal and cross-section, the shafts of which are degenerate and often replaced by blood-cells. Keratin is seen here in great excess, the protoplasmic outlines are almost entirely lost, and the stratum corneum appears like a homogeneous fibrous band. (See Figs. 3 and 4.) The stratum lucidum can be studied best in the preparations stained by Van Gieson's method, since it selects the picric acid dye, and is readily traced as a slender thread in all sections where extreme atrophy has not been reached. The width of the rete layer varies considerably in different parts of the specimens. Over those portions of the corium where inflammation is actively present, with diffuse small round-cell infiltration and sclerosis, the Malpighian layer is flattened and drawn out, and the papillæ are broad and

FIG. 5.



Showing hypertrophied epidermis, with blood-crust adherent to the surface; to the right fissure extending well into the corium. Hyaline transformation of outer portion of the corium, with entire absence of hair-follicles and sebaceous glands. In the deeper subepithelial tissue to the right, extensive areas of free red blood-corpuscles, with sclerosis of the elastic and muscular fibres; to the left, hair-follicles, bloodvessels, and bundles of muscular fibres in cross-section, with areas of small round-cell infiltration.

low, or wanting altogether. When, however, the inflammatory reaction is slight, small round cells appear, comparatively few in number, and the corium is but slightly altered; the papillæ are considerably elongated and more numerous, and long, finger-like processes of epithelium project between them. (See Fig. 5.) In all the fields where the extreme degree of atrophy has not been reached the individual cellular outlines in the Malpighian zone are sharp and distinct, pigment-granules are present in abundance, and the prickle cells are seen beautifully. The tissue beneath the epidermis furnishes us with a study of much interest. In some few places in the corium the delicate wavy outline of the elastic fibres is present, but in far the greater part a more or less extensive change is noted. The outer layers of the corium are



pale and slightly œdematous, the elastic fibres become indistinct, blend, lose their wavy outline, and become hyaline in character and matted together. Small round cells are found in large aggregations immediately beneath the epidermis, diffusely scattered throughout the corium and infiltrating the papillæ. In other places the corium appears dense and sclerotic, with scarcely any nuclei to be seen. The blood-capillaries have disappeared from the corium except in a few places, and no sebaceous or sweat glands can be found in any of the preparations. Areas of small round-cell infiltration extend deeply into the subcutaneous tissue, which also shows sclerotic changes. Here, also, hemorrhages have taken place, and free red blood-corpuscles are diffusely

FIG. 6.



Showing hypertrophied epidermis, adherent blood-crust on the surface; fissure extending through epidermis into the corium; and extensive round-cell infiltration in the subepithelial tissue. Hair-follicles and sebaceous glands entirely absent.

scattered through the loose stroma. Bloodvessels, fat, and unstriped muscle are present in normal amount. Points of special interest to be noted are the peculiar bundles that are found in the upper layers of the subcutaneous tissue. These can be seen both in longitudinal and in cross-section, and are well shown in the cut. (See Fig. 5.) While present in such numbers that it seems practically out of the question that they should be degenerate nerve-fibres, the histological resemblance is nevertheless most striking. The fibres are in distinct bundles, surrounded by dense fibro-elastic tissue, and on cross-section appear like nerve-fibres. The centre of each fibre is occupied by a dark round



body whose appearance is almost precisely like that of the axis-cylinder. That they are not nerve-fibres seems to be proven by the fact that the supposed axis-cylinder takes the hæmatoxylin color when stained by Van Gieson's method; that upon cross-section the fibres are not exactly round, but fit against one another like muscle cells; that upon longitudinal section spindle-shaped nuclei appear; and that when stained by Weigert's method the result is not characteristic. In none of the sections can any trace of nerve-fibres be positively found, though most careful search has been made for them.

The etiology of kraurosis is a matter upon which, as yet, the writers upon the subject have not been able to agree or to come to a positive conclusion. Breisky, who saw twelve cases, only attempted a clinical and pathological description, and could furnish no valuable etiological suggestion beyond the fact that some of the patients suffered previously from a vaginal discharge, and that in a number of them the symptoms of pruritus were markedly present.

Jenowsky<sup>3</sup> reports six cases, in one of which sclerotic œdema had been previously present. In his cases he considered that a long-continued discharge and syphilitic ulcers had had a definite bearing upon the etiology. This author compares kraurosis with leukoplakia of the mouth and tongue, and with urethral stricture.

Orthmann<sup>11</sup> made careful microscopical and bacteriological examinations of five cases from Martin's clinic, in Berlin, and while contributing to our knowledge of the pathology of the disease, could add nothing as to the etiology. He failed to find degenerate nerve-filaments in the diseased tissues, and considered gonorrhœa and a leucorrhœal discharge, one or the other of which had been present in all his cases, as etiological factors. He also examined the urine carefully for sugar, but could find no trace of it.

Hallowell<sup>9</sup> placed kraurosis among the large and interesting group of chronic inflammatory diseases of the skin and mucous membrane, such as ozæna, psoriasis of the mucous membrane, chimney-sweeper's eczema, and others, all of which are characterized by hypertrophy and metaplasia of epithelium, a hardened corium, and a tendency to terminate in epithelioma.

Olshausen<sup>25</sup> mentions the fact that in certain cases the atrophic changes have followed the removal of the uterine appendages. Others have also mentioned this fact, and have sought to associate it with the atrophy of the genital organs brought about by an artificially induced menopause.

It is quite possible that the climacteric period may play an auxiliary rôle in the progress of atrophy, but that this is an important factor is doubtful. Many of the cases have occurred in women past forty, and, on the other hand, a number of Breisky's cases were observed in women

who were pregnant, and Hallowell<sup>9</sup> describes one in a woman of thirty-three, whom he watched all through her pregnancy, and delivered at term without rupturing the perineum, although the skin surface of the vulva was extensively cracked and seamed.

Johnstone<sup>20</sup> describes kraurosis as trachoma of the urogenital canal.

Peters,<sup>16</sup> after careful microscopical examination, described the disease as a chronic hyperplasia of the subcutaneous tissue and corium, with a tendency to scar-like shrinking of the vulva. Attendant with and as a result of the subcutaneous atrophy, sclerosis and degeneration of the elastic tissue, the whole skin becomes involved with inflammatory œdema and atrophic lesions of the epidermis. But on the primary cause of the disease he throws no light.

Reed,<sup>15</sup> who re-introduced the subject of kraurosis five years ago, and presented a most complete description of six cases, together with the result of microscopical examination, suggested the term "progressive cutaneous atrophy of the vulva," on the supposition that the pathological lesions were confined to the skin.

As a result of the study of his own cases and the reports of others, he inclined to the theory that the disease of peripheral trophic nerve-filaments, or else the ganglia whence they originate, was the primary etiological factor. This, however, is a matter of theory and has no supporting evidence.

Longyear,<sup>26</sup> while advancing no positive opinion as to the etiology of kraurosis, nevertheless states that he does not believe the disease to be due to any local or constitutional disturbance outside the nervous system, and that the morbid process is due to defective nerve-action, probably reflex in origin.

Some writers have attempted to explain the origin of kraurosis in a previously existing specific lesion, but the large number of cases in which no syphilitic history can be traced, and in which venereal affections can be almost positively set aside, renders any serious consideration unnecessary. The testimony of Lewin,<sup>22</sup> too, who stated that he had treated between 70,000 and 80,000 women in his clinic at the Charité without ever seeing a case of kraurosis vulvæ, confirms the belief that this peculiar disease of the vulvæ is not of syphilitic origin.

Veit,<sup>33</sup> although himself having had but one case, reviews the whole subject in a scholarly article, and while exceedingly conservative in his statements as to what may be definitely proven in regard to the causation of the disease, nevertheless advances theories of etiology that are rational and deserving of careful consideration. In his opinion a close relationship exists between pruritus and kraurosis.

Recognizing in pruritus only a symptom, which by scratching is also able to produce an alteration of the skin of the vulva, in kraurosis he



holds that we have to do with an essential alteration of the skin, and accords to it a distinct position among diseases.

In his argument, Veit first calls attention to the fact that in the majority of cases of kraurosis the symptoms of itching are noticed at the onset, and then attempts to explain the precise relationship which exists between this disease and pruritus. While pruritus is but a symptom, definite lesions of the skin usually develop secondarily, owing to scratching and irritation, although actual lesions may be entirely wanting. Again, among the various causes of pruritus he recognizes that which later on develops into kraurosis. On the other hand, under the symptoms of kraurosis, he gives a prominent place to the itching of pruritus, which is only present at the beginning, but may be present all through the disease. So much only he feels is definitely proven. Hypothetically, however, he goes much further. Using the demonstration that the actual lesions of the vulva in pruritus are secondary, due probably to scratching or pinching up of the skin, he reasons by analogy that we can readily imagine that there was in the beginning a catarrhal inflammation of the vagina or the urethra, or a qualitative change in the urine; that these caused the sensation of itching, which again caused scratching, and again the peculiar alterations of the skin of the vulva, which anatomically are classed with the chronic inflammatory processes.

After the disease has continued for a long time the sensation of itching and the alteration of the skin may also continue even after the original cause of the disease has disappeared. The skin alterations eventually become to a certain extent permanent, and are curable only by excision. He feels, further, that he takes small risk in saying that with an intense degree of alteration of the skin, of small round-cell infiltration, *i. e.*, inflammation, there follows a marked shrinking, whereupon we have before us the picture of kraurosis. That all women do not complain of itching, or have not complained before, who seek relief for kraurosis, he easily explains by their sense of shame and the fear of being held in contempt by the physician as a masturbator, so that a failure to report this condition is quite excusable. Kraurosis, then, he describes as an ennarrowment and shrinking of the vulva, which is brought about by an inflammation of the skin, which again is brought about after intense itching, by scratching. That all cases of pruritus do not pass on into kraurosis is explained by the fact that many patients seek treatment for pruritus, and a sufficient alteration of the skin is not produced to bring about shrinking.

Sänger and Martin both lay stress on the interdependent relations which exist between pruritus and kraurosis, while Martin<sup>7</sup> places special weight on its development out of a previously existing inflammatory condition. Sänger alludes to it as a senile and presenile atrophy of the vulva.



After a careful review of the literature and a thorough microscopical study of our own case we would ascribe to kraurosis an inflammatory origin, modifying but slightly the theories of Veit and Martin. While it is possible that primary lesions in the trophic nerve-filaments, or the ganglia whence they spring, may be the cause of the local manifestation, this is purely a matter of theory, with no evidence whatever to support it, and seems to us unreasonable and not borne out by the pathological investigations. Our own opinion is that the cause is entirely a local one. Pruritus is such a constant symptom in the beginning of the disease in nearly all instances that its etiological bearing cannot be ignored, and we agree with the hypothesis of Veit, that the itching induces scratching, which in turn sets up a chronic inflammatory condition, with the formation of cicatricial tissue in the deeper layers of the derma and subcutaneous strata, shrinkage and contraction of the vulva, and atrophy of the skin surface. We, however, recognize the fact that the larger number of cases of pruritus apparently do not degenerate into kraurosis; that there is, therefore, some hidden impulse which causes further changes than ordinarily take place with the symptoms in this disease, with which impulse we are as yet unfamiliar, seems likely. This element may be either constitutional or local. When once this element is brought into play in the presence of pruritus we would go still further and be more explicit in our explanation as to how this result is brought about. As is well known, the skin surface is the constant habitat of various micro-organisms capable of producing inflammation and even suppuration. On rubbing, or scratching, irritation is produced and the normal cellular resistance impaired. The micro-organisms are now able to set up a low-grade inflammation which easily extends into the corium and underlying subcutaneous tissue. The skin surface may, however, be broken and the micro-organisms introduced from beneath the finger-nail or from the clothing. The corium and underlying subcutaneous stratum, rich in elastic tissue and unstriped muscular fibres, become sclerotic and hyaline in consistency, lose their elasticity, shrink and contract. The bloodvessels are pressed upon and their calibres gradually lessened and destroyed, while the nerve-filaments are rendered first hyperæsthetic and then succumb. Primary hyperplasia, the result of irritation, gradually gives way to atrophy, until the entire thickness of the skin above the areas of scarred tissue are involved. When the entire area has become atrophic the progress of the disease is arrested and the condition remains stationary, and the vaginal orifice narrow and contracted, but no further symptoms are manifest.

The atrophic process involves all the glands and appendages of the skin, so that the dry, glossy surface, dead-white appearance, and tendency to crack are readily accounted for. When this stage has been



reached it is readily seen that the only treatment that can be of any avail is the total removal of all scar tissue and an approximation of the edges of the healthy skin and mucous membrane.

The treatment of this condition has been divided into palliative and curative. The former is simply to relieve the subjective symptoms, which at times are excruciating. Carbolic acid and cocaine afford temporary relief, but the symptoms return soon after with renewed severity. Tait mentions the soothing effect of a solution of neutral acetate of lead in glycerin, placed on cotton between the nymphæ. Johnstone advises a salve of yellow oxide of mercury in the early stages.

Pure nitrate of silver applied repeatedly lessens the suffering, but has no effect upon the progress of the disease. Hot water often affords considerable temporary relief. Heitzmann has practised curettement and scraping of the diseased tissue, but the result has been entirely unsatisfactory and the process a long and painful one, requiring very many repetitions.

Martin<sup>17</sup> was the first to suggest complete excision of the diseased tissue as a curative measure, and applied the method in five cases, four of which were permanently cured, and one experienced a recurrence. Others have since followed the same method, the results obtained by Reed, and published in the article above referred to, being particularly gratifying. To be completely successful total excision of the diseased tissue should be accomplished. If this is done the prognosis is most favorable. Recurrence has occurred in some cases when this was not obtained and when the operation was performed before the process of atrophy had been entirely accomplished.

The history of the following typical case is herewith presented :

The patient, aged forty-three years, married nineteen years, is the mother of one child, which is fourteen years old. Her labor was entirely normal, no instrument being used and no febrile reaction following. She never had a miscarriage.

Until the last four years she has been a well woman, although always somewhat neurotic.

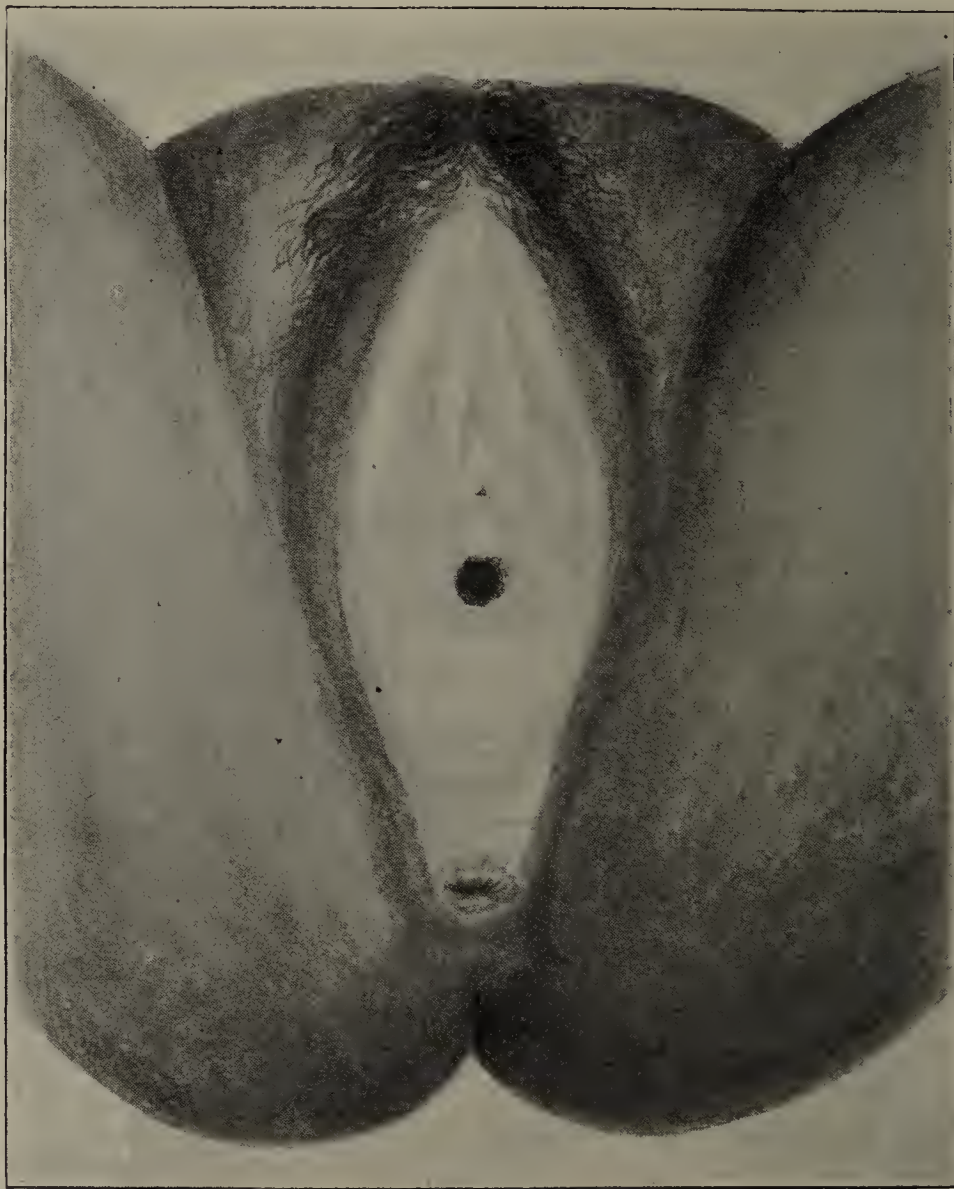
Four years ago she began to suffer from an obstinate itching about the vulva, which nothing could relieve permanently. Bathing with warm water gave as much temporary relief as anything, although all manner of washes and douches were tried by her physician. At times she suffered from a sensation of drawing and puckering about the vulva, which, however, lasted only a few hours, and then disappeared for a period of months. Her menstrual periods recur every four weeks, remaining for four or five days. The flow was free and accompanied by bearing-down pains which continued half a day. Some years ago she had a slight amount of leucorrhœa, but has had none whatever of late years.

At the present time she sleeps well and has a good appetite. She suffers somewhat from indigestion, resulting in gastric distress and abdominal distention after eating. Her bowels are regular in their action.

Urination at times is frequent, otherwise normal. There is a strong family history of pulmonary tuberculosis. Any possible venereal taint is easily eliminated. She is extremely nervous and excitable.

The patient was referred for treatment for an obstruction at the mouth of the vagina, which had been gradually increasing for some three or four years, and which had rendered sexual intercourse more and more difficult, until about two years ago, when it was abolished, not on account of any particular pain it caused, but because penetration became a physical impossibility. The contraction continued to such an extent that the husband and wife, as well as the physician in attendance, feared it might eventually become so complete as to prevent the escape of the menstrual flow. It was thought that possibly a tumor developing in the vagina might be the cause of the obstruction.

FIG. 7.



Showing affected area, with contracted vaginal orifice.

Repeated attempts at dilatation had been made by the physician in attendance, but all had resulted unsatisfactorily. The contraction progressed steadily. (See Fig. 7.) An examination of the parts affected disclosed the following condition:

Beginning in the mons veneris half an inch above the clitoris, and extending downward (in the form of an elongated oval) to just below



the anus, the skin and muco-skin of the entire enclosure and perineum presented a dead-white appearance, almost as though it had been badly macerated.

All trace of the clitoris and the nymphæ had disappeared, and the labia majora were almost obliterated as such. No trace of the fourchette was found, and the vaginal opening was barely sufficient to introduce the tip of the little finger, and only then with considerable pain to the patient. At the vaginal opening the disease extended laterally from the vaginal mucous membrane for the distance of one-half to three-quarters of an inch. There were no local points of redness and no leucorrhœal discharge.

At this time the patient had no symptom whatever except the obstruction, and that, of course, was noticeable only when coitus was attempted. The itching and drawing feeling, which at no time had been prominent, had disappeared. There was no obstruction to the flow of urine nor to the passage of the bowels, although the disease extended completely about both the urinary meatus and the anus. Surgical treatment was decided upon, and the patient submitted to the following operation, with the object of obtaining a sufficiently patulous condition of the vulva to enable her to resume her marriage relations:

A strip of skin one-half to three-quarters of an inch wide, beginning at the level of the urethra on one side and extending around the complete circumference of the vulva to the level of the urethra on the opposite side, was excised. The innermost edge of this strip followed the line of juncture of the vaginal mucous membrane throughout, there being a fairly sharp line between the healthy vaginal mucous membrane and the diseased tissue outside. Laterally, the strip was sufficiently wide to include all the diseased area, but as the incision circled around onto the perineum, between the vulva and anus, the strip, although it widened, could not be made to include all the diseased area, as this extended to below the anus. The incision was, however, carried as near the margin of the anus as possible.

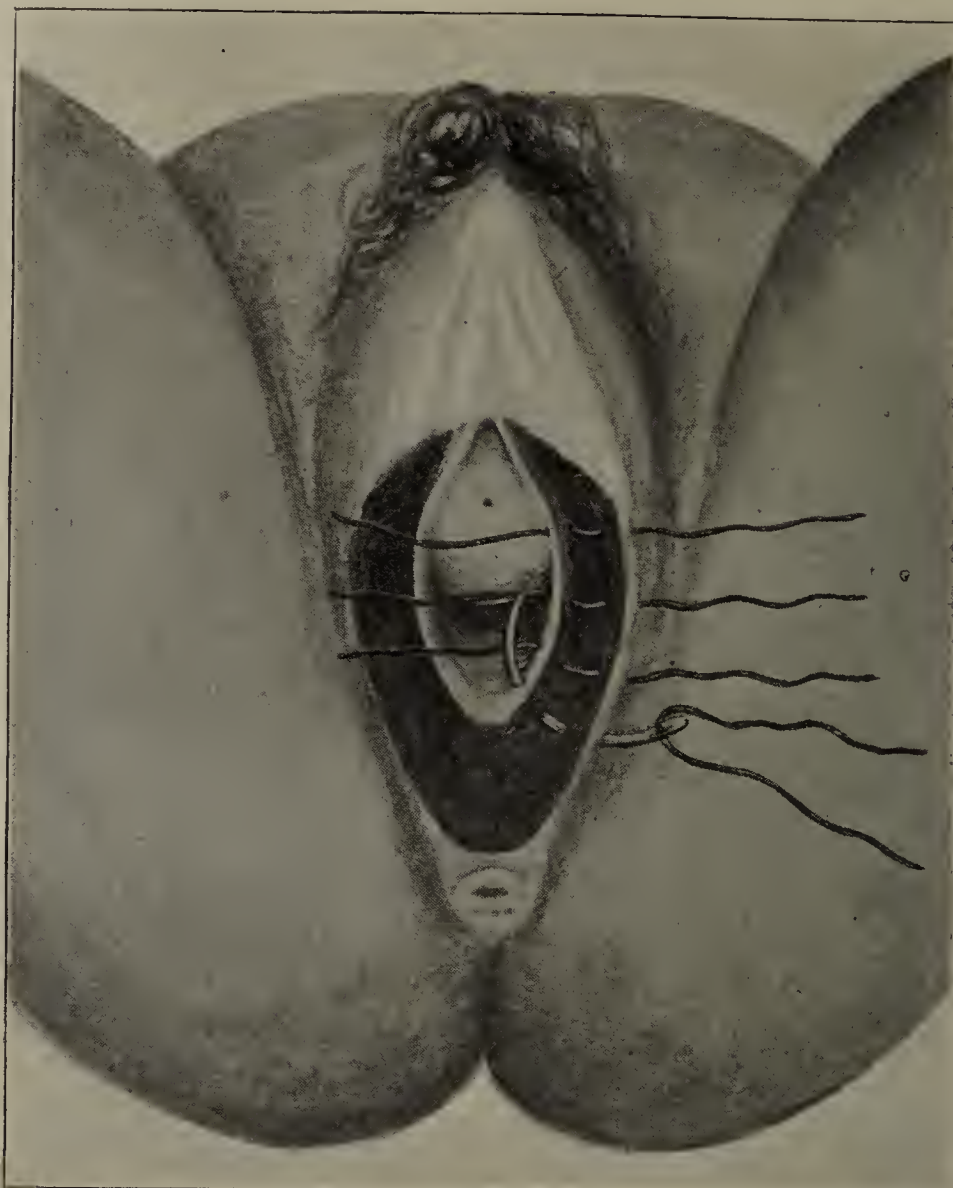
The knife was now passed directly into the septum between the vagina and rectum, through the denuded area to the depth of an inch, and the tissues freely incised laterally, with the object of cutting the muscles. The effect of this was to produce practically a partially torn or relaxed perineum, with a more or less gaping vulval orifice. The cut edge of the mucous membrane of the vagina and the skin were now readily brought together by interrupted silkworm-gut sutures, supplemented (see Fig. 8) by a continuous suture of fine silk. The object of this double suture of fine silk was to secure an accurate approximation of all incised edges, and to ensure the more certainty against any tearing out of the sutures when the vaginal plug, which it was proposed using, was inserted in the vagina.

A large glass plug two inches in diameter was then passed into the vagina and held in place by a T-bandage. The following day, on account of the tension of the stitches, this plug was replaced by a smaller one.

The plug was removed twice daily, and vaginal douches of boric acid administered each time. Union of the stitches being completed, they were removed at the end of ten days. The bladder was catheterized each time the plug was removed. Gradually the patient was taught how to introduce the plug, and on returning home at the end of

three or four weeks was given a hard-rubber plug one inch and a quarter in diameter, with instructions to introduce this twice daily, lie down, and allow it to remain an hour each time. After several months the introduction was reduced to once a day, and was finally withdrawn altogether. Just before allowing the patient to omit the daily introduc-

FIG. 8.



Showing denuded area and approximation of healthy skin and mucous membrane.

tion of the vaginal plug a letter was received from the husband relative to some irritation about the urethra, which was evidently set up by the frequent introduction. We quote the first few lines of this letter:

DEAR SIR: I wanted to write to you before now, but put it off from time to time. As far as sexual relation is concerned, Mrs. ———'s operation is a perfect success . . .

Yours truly,

The whole subject of future contraction is open to discussion, but we feel confident that such will not take place in this instance, for the disease had apparently reached its height, and had come to a standstill. But whether or not this be true, all the diseased area laterally was dissected away, and healthy skin and healthy vaginal mucous membrane



united. It is true the tissue about and above the clitoris is involved, as is also that about and below the anus, but it will be impossible for any amount of contraction at these points to affect the vaginal opening. The only danger to be feared will be the future involvement of the now healthy vaginal mucous membrane and skin, which have become united.

The patient will be watched with great interest. The possible future contraction of both the urethral and anal openings has been considered. Should either or both occur, a similar line of treatment to that carried out in the case of the vaginal opening will be adopted.

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